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DEPARTMENT OF
PHYSICS & ASTRONOMY

ANALYSIS OF DATA FROM THE ENERGETIC GAMMA-RAY EXPERIMENT ON THE GAMMA RAY OBSERVATORY

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ANALYSIS OF DATA FROM THE ENERGETIC GAMMA-RAY
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RESEARCH REPORT

(1) SUMMARY

The work under the Grant has involved continued participation with the Compton Gamma Ray Observatory Energetic Gamma-Ray Experiment Telescope (EGRET) Team in the analysis of data obtained during instrument operations and the preparation of scientific papers and proposals for future observations. The Principal Investigator (PI) has been a co-author on a total of twenty-six papers published in refereed professional journals since the beginning of 1993, plus several other non-refereed publications, and contributed and invited papers at professional meetings and IAU telegrams. The EGRET team continues to submit IAU Astronomical telegrams and present many papers at scientific meetings. The EGRET Team was also successful on many proposals for the Phase III portion of the mission, including long high galactic latitude studies of the diffuse extragalactic radiation. These studies will be used in a effort to establish whether this radiation is truly diffuse or the sum of radiation from unresolved discrete sources such as radio-loud quasars.

The effort by the PI has involved working remotely by internet connection on the Goddard Space Flight Center Computers where the EGRET data are archived. Students have monitored instrument performance and analyzed data remotely and will continue to do so. The PI has completed the detailed analysis of five viewing periods to search for point sources and this work has been used in developing the first EGRET catalog of sources, soon to be released.

During this period the PI again visited the Stanford University where he participated in data analysis and hosted a team meeting in June at Hampden-Sydney College and attended two team meetings at the Goddard Space Flight Center. The paper prepared by the PI on behalf of the EGRET Team entitled "Time Variability in the Gamma-Ray Emission of 3C 279", appeared in the 1 July 1993 issue of *The Astrophysical Journal* and the paper "EGRET Observations of Pulsars" for the *Proceedings of the Compton Centennial Symposium* at Washington University has now appeared in the AIP

Proceeding 280, 1993. A paper on observations of 47-Tucanae is being incorporated into a larger paper on limits from globular clusters which is currently in process.

Future efforts will involve the completion of the paper on globular clusters and the preparation of a paper on a galactic plane observation covering the region of galactic longitude from $100^\circ < l < 150^\circ$ on the plane. A second paper on the time variations of the quasar 3C279 is being incorporated into a paper on time variations of AGNs to be given by Professor Peter Michelson at the second *Compton Symposium*.

(2) PROGRESS

The progress of major efforts under this grant are given below:

- (a) The PI continues to participate in the preparation of many papers for publication in various journals for astronomy and astrophysics.
- (b) The PI is assisting in the preparation of papers for the second *Compton* symposium and will attend the meeting in September 1993.
- (c) The PI will continue to analyze a portion of the viewing periods for the presence of discrete source with student participation at Hampden-Sydney College.
- (d) The PI is preparing a paper describing the significance of upper limits obtained by EGRET on the globular clusters in conjunction with EGRET Team Members.
- (e) The PI continues to attend EGRET Team Meetings as possible and works closely with the rest of the EGRET Team on data analysis.
- (f) The PI is in the process of preparing a paper on the sources seen in the galactic viewing interval from longitude 100 to 150 degrees between ± 10 degrees in latitude.

(3) PUBLICATIONS

The following are articles co-authored by the PI which are related to this work and which have appeared or are accepted and scheduled to appear in refereed journals since the inception of this Grant.

1992 "A High Frequency Survey of the Southern Galactic Plane for Pulsars", S. Johnston, A. G. Lyne, R. N. Manchester, D. A. Kniffen, N. D'Amico, J. Lim and M. Ashworth, *Monthly Notices of the Royal Astronomical Society* **255**, 401.

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1992 "EGRET Detection of High Energy Gamma Radiation from the OVV Quasar 3C454.3," R.C. Hartman, D.L. Bertsch, C.E. Fichtel, S.D. Hunter, G. Kanbach, P. Kwok, D.A. Kniffen, Y.C. Lin, J.R. Mattox, H.A. Mayer-Hasselwander, P.F. Michelson, C. v. Montigny, P.L. Nolan, K. Pinkau, H. Rothermel, E. Schneid, P. Sreekumar, and D.J. Thompson, *Astrophys. J.* **401**, L61.

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(4) PLANNED ACTIVITIES

In the coming period, several publications will be completed, the PI will continue to analyze EGRET data and viewing periods, and frequent visits will be made to the GSFC for collaboration with the EGRET Co-Investigators. Two papers, currently in progress, on EGRET results will be completed and submitted for publication. The GSFC EGRET team will be supported in data reduction and operations activities, and EGRET Team meetings will be attended. Scientific results will be presented at future scientific meetings such as the January meeting of the American Astronomical Society in Washington, D.C.

